

REMARKS

Claim 1 is proposed to be amended by insertion of the word "both" in the last line thereof to further emphasize and distinguish the claimed invention from the references as applied, and commensurate with arguments previously advanced during the prosecution of the present application. Similar amendments are proposed for claims 2, 3 and 21. No new matter has been added.

The Final Office Action mailed May 6, 2004, has been received and reviewed. Claims 1 through 14 and 16 through 29 are currently pending in the application. Claims 1 through 14 and 16 through 29 stand rejected. Applicants propose to amend claims 1-3 and 21, and respectfully request reconsideration of the application as proposed to be amended herein.

Information Disclosure Statement(s)

Applicants note the filing of a Supplemental Information Disclosure Statement herein on September 16, 2003 (with the Request for Continued Examination filed herein by Express Mail on September 16, 2003) and note that no copy of the PTO/SB/08 was returned with the outstanding Office Action. Applicants respectfully request that the information cited on the PTO/SB/08 be made of record herein. A true copy of the Supplemental Information Disclosure Statement, the PTO/SB/08 and of the non-U.S. patent documents cited therein are enclosed for the Examiner's convenience, as is a copy of the date-stamped postcard evidencing receipt of same by the Office.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 5,135,485 to Cohen et al. in view of U.S. Patent No. 4,601,201 to Oota et al.

Claims 1 through 6, 13, 14, 16, 17 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cohen et al. (U.S. Patent No. 5,135,485) in view of Oota et al. (U.S. Patent No. 4,601,201). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of claims 1-6, 13, 14, 16, 17 and 20 are improper because the Office has apparently again misunderstood the teachings of both the Cohen et al. and the Oota et al. reference.

Applicants propose to amend claim 1 to further emphasize that the first and second electrodes of their claimed sensor are arranged such that a majority of each of their respective areas are both vertically and horizontally offset from each other. This amendment does not reduce the scope of the claims, but is merely an attempt to clarify the claimed structure in the Office's perception in distinguishing it from the art as applied and in further support of Applicants' prior arguments.

With respect to claim 1, as noted in Applicants' last two responses and contrary to the Examiner's assertion, the electrodes 10, 12 of Cohen et al. do not have a majority of their respective areas both horizontally *and* vertically offset from each other. Using the Cohen et al. drawing figures relied upon by the Office as examples, it can be seen that, in FIG. 2, electrodes 10 and 12 are vertically offset (one above the other) but are, in major part, horizontally overlapping. Claim 1 requires that a majority of the electrode areas be both horizontally *and* vertically offset. Similarly, FIG. 7 of Cohen et al. illustrates electrodes 10, 12 which are horizontally offset (side by side) but are, in major part, vertically overlapping. Thus, in one embodiment of Cohen et al. the electrodes are vertically offset and, in another embodiment, they are horizontally offset, but in *no* embodiment are a majority of the respective areas of the electrodes both vertically and horizontally offset from one another. The Office also points to

FIG. 3 of Cohen et al., but FIG. 3 is substantially similar to FIG. 2 and affords no additional teaching. Moreover, the Office has not identified any motivation or suggestion within Cohen et al. to *combine* the embodiments of FIGS. 2 and 7. Further, in the outstanding Office Action the Office mentions FIG. 6 of Cohen, wherein plates 80 and 82 are placed in a pattern that would make it possible to detect discrete levels of fluid. While Applicants appreciate this teaching, this does not add anything to the teachings of FIGS. 2 and 7 but, rather, reiterates the teachings of FIGS. 2 and 3, which teach substantial (more than a majority) horizontal electrode overlap with vertical spacing. With respect to Oota et al., the Office is misreading the teachings thereof. First, contrary to the assertion in the Office Action, there are not electrodes placed “where a majority of their areas are vertically and horizontally offset (zig-zagged) from each other (Figure 1A).” As noted in Col. 3, lines 50-54 and Col. 4, lines 34-68 (with respect to FIGS. 2A and 2B), the segmented electrodes 21a – 21n are part of the **same electrode** of a pair of electrodes. In other words, printed substrate 20 and electrodes 21a-21n thereon comprise a *single, segmented* inner electrode, the segments of which do not cooperate with each other to provide a capacitance-based output. The Office has misread or misconstrued Applicants’ prior arguments in stating (Office Action, page 10, numbered paragraph 8) that “electrodes 21a-21n as explained by the Applicant are in individual cooperation with one another.” To the contrary, any of the segmented electrodes 21a – 21n are not mutually cooperative, as required by the language of claim 1. Rather, each given segment of electrodes 21a – 21n individually cooperates with *another*, outer electrode 14. The other, outer electrode 14 (see Col. 3, line 65 through Col. 4, line 10) is a metallic pipe that extends substantially the entire length of inner printed circuit 20 and electrodes 21a – 21n. Thus, outer electrode 14 vertically overlaps *each* electrode segment 21a – 21n as well as *all* of electrode segments 21a – 21n.

Applicants also note that outer electrode 14 is in contact with the fluid within tank RS on both the exterior of electrode 14 and the interior thereof, through holes 14'. Oota et al. provides signals of liquid level in tank RS by virtue of the capacitance between one of the inner electrode segments electrodes 21a – 21n and a laterally adjacent portion of outer electrode 14, *not* between two of the inner electrodes 21a – 21n (Col. 5, lines 19-22). Therefore, Oota et al. fails to address

the deficiencies in Cohen et al. due to the lack of both vertically *and* horizontally offset electrodes and because outer electrode 14 is not “in isolation from the interior volume of the container” as required by claim 1.

Moreover, due to the difference in structure and mode of operation between Cohen et al. and Oota et al., there would be no motivation to combine the references *or* any reasonable expectation of success of making the asserted combination. The only possible motivation or suggestion for combining the two references would appear to reside in Applicants’ own specification which, the Office will readily acknowledge, would constitute impermissible hindsight.

While the Office correctly states the test for proper combination of references, there is 1) no motivation or suggestion to combine embodiments of Cohen et al., 2) no motivation or suggestion to modify the teachings of Cohen et al. with the teachings of Oota et al. due to the latter’s significantly different operational mode (electrodes in contact with the fluid being measured) and 3) no reasonable expectation of success for the combination due to the different operational modes. Accordingly, the rejection is unsupported by the attempted combination of references and Applicants respectfully request that it be withdrawn. Further, as noted above and previously, Oota et al. does not support the teaching asserted by the Office for curing the deficiencies in Cohen et al.

Claims 2, 3 and 4 are allowable as depending from claim 1 and further because the combination of references fails to teach or suggest all the claim limitations with regard to the mutual arrangement of the first and second electrodes, for the reasons set forth above with respect to claim 1. Applicants note that the limitations of each of claims 2, 3 and 4 must be read *in addition to* those of claim 1 from which each depends, and not in isolation.

Claims 5, 6 and 13 are allowable as depending from claim 1.

Claim 14 is allowable as depending from claim 1 and further because the combination of references fails to teach or suggest all the claim limitations, for the reasons set forth above with respect to claim 1. Applicants note that the limitations of claim 14 must be read *in addition to* those of claim 1 from which each depends, and not in isolation.

Claims 16, 17 and 20 are allowable as depending from claim 1.

Obviousness Rejection Based on U.S. Patent No. 5,135,485 to Cohen et al. in View of U.S. Patent No. 4,601,201 to Oota et al. in View of U.S. Patent No. 4,201,085 to Larson

Claims 7, 8, and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cohen et al. (U.S. Patent No. 5,135,485) in view of Oota et al. (U.S. Patent No. 4,601,201), as applied to claim 1 above, and in view of Larson (U.S. Patent No. 4,201,085). Applicants respectfully traverse this rejection, as hereinafter set forth.

The 35 U.S.C. § 103(a) obviousness rejections of claims 7, 8 and 12 are improper because Larson fails to remedy the deficiencies of Cohen et al. and Oota et al. with respect to the latter's failure to meet the claim limitations of claim 1, from which claims 7, 8 and 12 each respectively depend. Thus, the combination of references fails to teach or suggest all of the claim limitations, as required. Accordingly, claims 7, 8 and 12 are not obvious over the combination of Cohen et al., Oota et al. and Larson.

Obviousness Rejection Based on U.S. Patent No. 5,135,485 to Cohen et al. in View of U.S. Patent No. 4,601,201 to Oota et al. in View of U.S. Patent No. 5,406,843 to Hannan et al.

Claims 9 through 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cohen et al. (U.S. Patent No. 5,135,485) in view of Oota et al. (U.S. Patent No. 4,601,201), as applied to claim 1 above, and in view of Hannan et al. (U.S. Patent No. 5,406,843). Applicants respectfully traverse this rejection, as hereinafter set forth.

Once again, Applicants respectfully assert that the Office has misinterpreted the Hannan et al. reference. Specifically, Col. 9, lines 63-66 discloses providing a *timing* or clock signal of about 2-8 Mhz to controller 16 to time its operation which, as noted at Col. 7, lines 7-37, cited by the Office, consists of "short duration DC pulses" and *not* an oscillating signal. There is no teaching that the *output* of controller 16 as an *input* to the electrodes is within a 2-8 Mhz range. In fact, Hannan et al. is silent on the issue as to what the drive frequency may be. The Col. 5 and Col. 7 citations referenced by the Office do not support the providing of an *oscillating input*

signal as required by each of claims 9, 10 and 11, each require providing an oscillating signal to one of the first and second electrodes. Thus, in addition to not remedying the deficiencies of Cohen et al. and Oota et al. with respect to claim 1, Hannan et al. does not, in fact, provide a teaching or suggestion of the limitations respectively set forth in each of claims 9,10 and 11. While the Office has cited two additional references, Kelly and Matzuk, apparently for the proposition that oscillating signals and DC pulses are equivalent, or at least that one of ordinary skill in the art would know how the change in signal type would affect device output, the Office has declined to employ these in a rejection and, moreover, has failed to provide a rationale as to why one would be motivated to adopt the teachings of Hannan et al. and drive the device of Cohen at the recited frequencies and using a DC pulse signal in lieu of an oscillating signal. As noted in a prior response, there is no suggestion or motivation in either of the references, or in the art as a whole, to make the attempted combination since Cohen et al. as well as Oota et al. appear to use an oscillatory input signal while Hannan et al. uses a pulsed input signal and the methods of detection and analysis of the output signals of each of the references are quite different.

Obviousness Rejection Based on U.S. Patent No. 5,135,485 to Cohen et al. in View of U.S. Patent No. 4,601,201 to Oota et al. in View of U.S. Patent No. 3,939,360 to Jackson

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Cohen et al. (U.S. Patent No. 5,135,485) in view of Oota et al. (U.S. Patent No. 4,601,201), as applied to claim 1 above, and in view of Jackson (U.S. Patent No. 3,939,360). Applicants respectfully traverse this rejection, as hereinafter set forth.

Claim 18 is allowable as ultimately depending from claim 1. Jackson fails to remedy the deficiencies of Cohen et al. with respect to claim 1. Further, contrary to the Examiner's assertion, Jackson fails to teach or suggest a thin, insulative film mounting structure for the electrodes. Rather, the text relied upon in Jackson teaches the use of a plastic or silicone film or smearing petroleum jelly on the exterior of the intravenous bottle *before* applying the electrode assembly—so that moisture on the bottle doesn't short between the electrodes (Col. 8, lines 36-40). Thus, claim 18 is not obvious.

The Office has asserted that, because Jackson teaches application of a thin insulative film to a container where electrodes are to be placed, when the electrodes are so placed the film becomes a mounting structure. Applicants acknowledge this argument but do not concede the propriety thereof, as Applicants are claiming a sensor in and of itself, and not necessarily as affixed to a container.

In any case, claim 18 is allowable as ultimately depending from claim 1.

Obviousness Rejection Based on U.S. Patent No. 5,135,485 to Cohen et al. in View of U.S. Patent No. 4,601,201 to Oota et al. and U.S. Patent No. 3,939,360 to Jackson, and Further in View of U.S. Patent No. 5,051,921 to Paglione

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Cohen et al. (U.S. Patent No. 5,135,485) in view of Oota et al. (U.S. Patent No. 4,601,201) and Jackson (U.S. Patent No. 3,939,360), as applied to claim 18 above, and further in view of Paglione (U.S. Patent No. 5,051,921). Applicants respectfully traverse this rejection, as hereinafter set forth.

Applicants note that Paglione employs an electrode assembly disposed within a tank, and therefore in contact with the liquid within the tank. Applicants note that this is also the case with Oota et al. (electrode 14). Cohen et al. and Jackson, to the contrary, place their electrode assemblies on the exterior of a container and in isolation from liquid to be measured. Thus, the operative measuring technique is different in Paglione than in the two other references, and there would be no motivation or suggestion to make the asserted combination.

The Office has asserted that Cohen et al. teaches disposition of electrodes within a container. However, the text relating to FIG. 12 (Col. 11, lines 39-57) clearly confirms that “external support container 92” is an external support for the flexible plastic bag 13 *in which the fluid the level of which is to be measured is disposed*. Thus, electrodes 10 and 12, while nominally on the inside of the support container, are nonetheless on the *outside* of flexible plastic bag 13 in which fluid resides and are pressed against the exterior of the bag by the weight of the fluid in the bag. Accordingly, electrodes 10 and 12 remain in isolation from the fluid.

Withdrawal of the rejection is respectfully requested.

Claim 19 is further allowable as ultimately depending from claim 1.

Obviousness Rejection Based on U.S. Patent No. 5,135,485 to Cohen et al. in View of U.S. Patent No. 4,601,201 to Oota et al. and U.S. Patent No. 5,406,843 to Hannan et al.

Claims 21 through 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cohen et al. (U.S. Patent No. 5,135,485) in view of Oota et al. (U.S. Patent No. 4,601,201) and Hannan et al. (U.S. Patent No. 5,406,843). Applicants respectfully traverse this rejection, as hereinafter set forth.

With respect to claim 21 as proposed to be amended, the combination of Cohen et al. in view of Oota et al. is deficient for the same reasons advanced previously with respect to claim 1. Similarly, Hannan et al. is deficient for the same reasons advanced previously with respect to claims 9-11. Further, as noted previously with respect to claims 9-11, there is no motivation or suggestion to make the attempted combination of Cohen et al., Oota et al. and Hannan et al..

Claim 22 is allowable as depending from claim 21.

Claims 23 and 24 allowable because, as noted previously, Hannan et al. does not supply an oscillating signal of the claimed frequencies as an *input* to the capacitive structure as claimed, but rather uses a timing signal of between 2 and 8 Mhz supplied *to* the controller, which in turn supplies a pulsed, short duration DC input signal of undisclosed frequency to the electrodes.

Claims 25-29 are allowable as depending from claim 21.

ENTRY OF AMENDMENTS

The proposed amendments to claims 1, 2, 3 and 21 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search. Finally, if the Examiner determines that the amendments do not place the application in condition for allowance, entry is respectfully requested upon filing of a Notice of Appeal herein.

CONCLUSION

Claims 1 through 14 and 16 through 29 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

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Date: July 6, 2004
JAW/ps:ljb
Document in ProLaw